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Barriers in Information Use - A Study among Ophthalmologists in India

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Abstract:

Background:

Ophthalmologists – Eye Doctors working in academic eye hospitals confront various barriers in their information use. The purpose of this study is to investigate the barriers of ophthalmologists in their information use.

Methodology:

The study design is cross sectional and convenience sampling method is adopted. A structured questionnaire was used to collect data. SPSS 18 PASW Statistical package was used for statistical analysis. Frequencies, percentages, Mann Whitney U test, Kruskal-Wallis test, Factor Analysis, Wilcoxon signed rank test were used in the study.

Findings:

Around 633 ophthalmologists working in 47 academic eye hospitals from 16 states of India were included in the study. The study results revealed that majority of the ophthalmologists encountered the barrier "Information scattered in too many sources". The statistical test results showed up that there exist a significant difference between barriers in using information among ophthalmologists and institution type. The two major factors of barriers in using information among ophthalmologists were for lack of motivation and support and brunt of technology. The barriers due to brunt of technology were significantly higher than the lack of motivation and support.

Conclusion:

The barriers faced by ophthalmologists can be jointly handled by the ophthalmic libraries, ophthalmic institutions, information service providers and ophthalmic community.

Keywords: Barriers; Ophthalmologists; information need; information seeking behavior; user study; information use;

1. Introduction:

Information is not only the fuel of our democracy; it is a vital source in every professional field.

Ophthalmologists - Eye doctors working in academic eye hospitals seek information for their information need. They refer several information sources through their searching techniques, retrieve information after proper evaluation and use it appropriately. Adequate and quality information retrieved on time will help the ophthalmologists to provide better patient care to patients, enable them to capacity building of the human resources, administrate the clinics efficiently and advance in their research work. But, the ophthalmologists face barriers in information use and that limits the information use.

The present study attempted to investigate the ophthalmologists' barriers in information seeking and examine if the preferences differed based on their individual characteristics and institution characteristics. The characteristics chosen for examination were gender, age, designation, working experience and institution type. This study will help to identify the major barriers in information seeking of ophthalmologists. It will provide an understanding of the hurdles faced by the ophthalmologists in seeking information. This will help the libraries, institutions, information service providers, ophthalmic community to initiate necessary steps.

2. Review of Literature:

Khan, S. A., (2011) explored the Information needs and information-seeking behavior of college faculty at Bahawalpur. A total of 56 faculties were included in the study. Most of them pointed out that they sometimes face the following problems such as lack of computer hardware and software, information scattered in too many sources and lack of time for searching it, non-availability of required material, and lack of training or help in IT.

Korobili, S.,(2011) investigated the factors that influence information-seeking behavior: The case of Greek graduate students. They were asked to share barriers they face in information retrieval. It seems that the main barrier was "retrieve records with high recall and low precision" and then "too "face problemsto retrieve records of good quality and relevantto the information need."

Natarajan, M. (2013) investigated the information seeking behaviour of students of Management Institutions in NCR of Delhi. A detailed questionnaire is circulated around 250 students and 197 of them responded. The respondents were asked to mention the problems faced while seeking information. Majority of students 49.7% were not aware of the existing resources in the library, followed by 40.6% not aware of using the information retrieval tools.

Argyri, P., (2014) analyzed the information seeking behaviour of nurses at a private hospital in Greece. The total no. of nurses enrolled in the study was 57. The nurses reported that lack of time was the main obstacle when seeking information.

O'Carroll, A. M., (2015) investigated the Information-seeking behaviors of medical students. The survey included 213 medical students. Students identified challenges managing information and/or resource overload and source accessibility.

Ali Hassan, F., (2016) conducted a survey to profile the distance learning students in Wawasan Open University based on their information seeking behaviour. A total of 435 students were included in the study. Majority of the students responded that they were unable to determine the appropriateness of the information. Majority of the students were not sure how to integrate the information into assignments and research work.

3. Objectives of the study:

- To identify the barriers in using information among ophthalmologist
- To examine the barriers in using information among both male and female ophthalmologists
- To find out the barriers in using information among ophthalmologists in different age groups
- To measure the barriers in using information among ophthalmologists working in different designations
- To examine the barriers in using information among ophthalmologists with different working experience
- To find out the barriers in using information among ophthalmologists working in different institution types

4. Hypotheses of the study:

1. The barriers in using information among ophthalmologists differs by gender
2. The barriers in using information among ophthalmologists differs by age group
3. The barriers in using information among ophthalmologists differs by designation
4. The barriers in using information among ophthalmologists differs by experience
5. The barriers in using information among ophthalmologists differs by institution type

5. Methodology:

The main purpose of the study was to find out the barriers in using information among ophthalmologists. The research design adopted for this study was cross sectional. Convenience sampling method was found appropriate to enroll the wide-spread ophthalmologist population and the same was followed in the study. A structured questionnaire was used as a data collection tool to record the barriers in using information among ophthalmologists. A total of 633 ophthalmologists from 47 academic eye hospitals in 16 states of India were included in the study. The collected data were entered into data-entry software, purposefully developed for the study. The software was developed in Microsoft Visual Basic 6.0 with backend SQL Server 2000. For further analysis, the data stored in SQL Server 2000 was extracted into Ms-Excel 2007 spreadsheets. MS-Excel 2017 was used to organize and tabulate the data. SPSS 18 PASW Statistical package was used for statistical analysis. Frequency counts and Ranks were used to find out the most common attitude of ophthalmologists. The Mann Whitney U test was used to

examine the barriers with gender. The Kruskal-Wallis test was used to examine the barriers with age, designation, experience, and institution type.

6. Analysis:

The barriers in using information among Ophthalmologists had been ascertained based on nine variables with a five point scale such as "1-Never", "2-Rarely", "3-Seldom", "4-Often" and "5-Most Often". The internal consistency of the variables were measured by Cronbach's alpha (Alpha >0.70 is considered as acceptable). The alpha coefficient for the variables is 0.8786 which indicates that the variables have relatively high internal consistency. Number of responses, percentage, mean, standard deviation, median and rank were shown in Table 1. Ranks were assigned based on mean and standard deviation.

Table 1: BARRIERS IN USING INFORMATION – SUMMARY

S.no	Description	Never (%)	Rarely (%)	Seldom (%)	Often (%)	Most Often (%)	Mean (SD)	Median	Rank
1	Lack of time	60 (9.5%)	193 (30.5%)	131 (20.7%)	192 (30.3%)	57 (9%)	2.99 (1.16)	Seldom	7
2	Information overload	11 (1.7%)	102 (16.1%)	136 (21.5%)	298 (47.1%)	86 (13.6%)	3.55 (0.97)	Often	3
3	Lack of searching skills/access mechanism	24 (3.8%)	138 (21.8%)	152 (24%)	253 (40%)	66 (10.4%)	3.31 (1.04)	Often	5
4	Information scattered in too many sources	7 (1.1%)	72 (11.4%)	71 (11.2%)	354 (55.9%)	129 (20.4%)	3.83 (0.92)	Often	1
5	Technical / power / network problems	33 (5.2%)	121 (19.1%)	139 (22%)	268 (42.3%)	72 (11.4%)	3.36 (1.07)	Often	4
6	Internet connectivity	42 (6.6%)	139 (22%)	110 (17.4%)	274 (43.3%)	68 (10.7%)	3.3 (1.12)	Often	6
7	Limited knowledge on technology	14 (2.2%)	71 (11.2%)	123 (19.4%)	344 (54.3%)	81 (12.8%)	3.64 (0.92)	Often	2
8	No opportunity to learn	82 (13%)	242 (38.2%)	141 (22.3%)	125 (19.7%)	43 (6.8%)	2.69 (1.13)	Rarely	9
9	No guidance / support	76 (12%)	219 (34.6%)	152 (24%)	134 (21.2%)	52 (8.2%)	2.79 (1.15)	Seldom	8

It can be seen from the table 1 that "Information scattered in too many sources" was the first preference of ophthalmologists. It is followed by "Limited knowledge on technology", "Information overload" which was their second and third preferences. The least preference was "No opportunity to learn". The mean value of the responses ranges between 2.69 and 3.83. The standard deviation of the responses ranges between 0.92 and 1.16.

The information barriers among both the female and male ophthalmologists were analyzed further and ranks were assigned based on mean and standard deviation. The mean, standard deviation, rank and Mann Whitney U test results were shown in Table 2

TABLE 2: BARRIERS IN USING INFORMATION Vs GENDER

S.no	Description	Female		Male	
		Mean (SD)	Rank	Mean (SD)	Rank
1	Lack of time	3.09 (1.11)	7	2.9 (1.2)	7
2	Information overload	3.5 (0.97)	3	3.59 (0.98)	3
3	Lack of searching skills/access mechanism	3.35 (1.02)	6	3.29 (1.06)	4
4	Information scattered in too many sources	3.85 (0.92)	1	3.82 (0.91)	1
5	Technical/power/network problems	3.48 (1.02)	4	3.25 (1.11)	5
6	Internet connectivity	3.46 (1.04)	5	3.15 (1.17)	6
7	Limited knowledge on technology	3.63 (0.93)	2	3.65 (0.91)	2
8	No opportunity to learn	2.73 (1.15)	9	2.66 (1.12)	9
9	No guidance / support	2.85 (1.16)	8	2.73 (1.15)	8

Rank is derived for each gender group based on the mean and standard deviation of ophthalmologists' barriers. The ranks show up that most of the female and male ophthalmologists face the barrier - "Information scattered in too many sources".

A Mann Whitney U test was conducted to determine whether there is any difference between ophthalmologists' barriers and gender. The mean rank for male ophthalmologists was 320.85. The mean rank for female ophthalmologists was 312.57. The test showed that there doesn't exist a statistical difference between ophthalmologists preference and gender (P-value=0.569)

The information barriers ophthalmologists in different age groups were analyzed further and ranks were assigned based on mean and standard deviation. The mean, standard deviation, rank and Kruskal-Wallis test results were shown in Table 3

TABLE 3: BARRIERS IN USING INFORMATION Vs AGE GROUP

S.no	Description	Less than or equal to 30		31 to 40		41 to 50		51 to 60		61 and
		Mean (SD)	Rank	Mean (SD)	Rank	Mean (SD)	Rank	Mean (SD)	Rank	Mean (SD)
1	Lack of time	2.99	7	2.93	7	3.13	7	3.19	5	3.25

		(1.12)		(1.19)		(1.12)		(1.47)		(0.71)
2	Information overload	3.47 (0.97)	3	3.53 (1)	3	3.74 (0.94)	2	3.81 (0.87)	1	3.5 (0.53)
3	Lack of searching skills/access mechanism	3.29 (1.07)	6	3.32 (1.02)	5	3.38 (1.07)	6	3.24 (1.22)	4	3.13 (0.64)
4	Information scattered in too many sources	3.78 (0.91)	1	3.87 (0.94)	1	3.87 (0.86)	1	3.81 (1.03)	2	3.38 (0.74)
5	Technical/power/network problems	3.35 (1)	4	3.38 (1.11)	4	3.42 (1.1)	4	3.1 (1.3)	6	2.75 (0.71)
6	Internet connectivity	3.32 (1.07)	5	3.29 (1.17)	6	3.4 (1.05)	5	2.67 (1.35)	9	3.13 (0.83)
7	Limited knowledge on technology	3.67 (0.89)	2	3.67 (0.93)	2	3.61 (0.91)	3	3.33 (1.11)	3	3.13 (0.64)
8	No opportunity to learn	2.66 (1.08)	9	2.68 (1.13)	9	2.74 (1.16)	9	2.86 (1.56)	7	3 (0.76)
9	No guidance / support	2.76 (1.07)	8	2.8 (1.18)	8	2.81 (1.19)	8	2.81 (1.54)	8	3 (0.76)

Rank is derived for each age group based on the mean and standard deviation of ophthalmologists' barriers. The ranks show up that most of the ophthalmologists in the age group "Less than or equal to 30", "31 to 40", "41 to 50" face the barrier - Information scattered in too many sources. Most of the ophthalmologists in the age group "51 to 60", "61 and above" prefer "Information overload".

A Kruskal-Wallis H test was conducted to determine if ophthalmologists' barriers differ with age groups. The mean ranks for the age groups were Less than or equal to 30 (309.55), 31 to 40 (318.09), 41 to 50 (339.50), 51 to 60 (297.81), 61 and above (278.75) respectively. The test showed that there doesn't exist a statistical difference between ophthalmologists barriers and age groups ($\chi 2(2) = 2.306$, P-value=0.680).

The information barriers among ophthalmologists in different designation groups were analyzed further and ranks were assigned based on mean and standard deviation. The mean, standard deviation, rank and Kruskal-Wallis test results were shown in Table 4

TABLE 4: BARRIERS IN USING INFORMATION Vs DESIGNATION

S.no	Description	Medical Officer		Fellows		Senior Resident	
		Mean (SD)	Rank	Mean (SD)	Rank	Mean (SD)	Rank
1	Lack of time	3.01 (1.22)	7	2.98 (1.08)	7	2.71 (1.07)	9
2	Information overload	3.59 (0.98)	2	3.47 (0.98)	3	3.79 (0.43)	1
3	Lack of searching skills/access mechanism	3.33 (1.05)	4	3.31 (1.01)	6	3.07 (1.44)	5

4	Information scattered in too many sources	3.84 (0.91)	1	3.84 (0.93)	1	3.43 (1.02)	3
5	Technical/power/network problems	3.32 (1.13)	5	3.42 (0.99)	4	3.21 (1.12)	4
6	Internet connectivity	3.25 (1.16)	6	3.38 (1.06)	5	2.93 (1.21)	6
7	Limited knowledge on technology	3.58 (0.97)	3	3.74 (0.85)	2	3.64 (0.74)	2
8	No opportunity to learn	2.72 (1.19)	9	2.65 (1.03)	9	2.79 (1.25)	8
9	No guidance / support	2.78 (1.21)	8	2.8 (1.06)	8	2.86 (1.17)	7

Most of the ophthalmologists in the designation group "Medical Officers", “Fellows” prefer " Information scattered in too many sources ". Most of the ophthalmologists in the designation group "Senior Residents" face the barrier - “Information overload ".

A Kruskal-Wallis H test was conducted to determine if ophthalmologists’ barriers differ with designation groups. The mean ranks for the designation groups were Medical Officer (317.64), Fellows (318.58), Senior Residents (271.54) respectively. The test showed that there doesn’t exist a significant difference between ophthalmologists barriers and designation groups ($\chi 2(2) = 0.892$, P-value=0.640).

The information barriers among ophthalmologists in different experience groups were analyzed further and ranks were assigned based on mean and standard deviation. The mean, standard deviation, rank and Kruskal-Wallis test results were shown in Table 5.

TABLE 5: BARRIERS IN USING INFORMATION Vs EXPERIENCE

S.no	Description	Less than or equal to 5 years		6 to 10 years		11 to 15 years		16 to 20 years		21 and ab years	
		Mean (SD)	Rank	Mean (SD)	Rank	Mean (SD)	Rank	Mean (SD)	Rank	Mean (SD)	Ra
1	Lack of time	2.95 (1.15)	7	3.03 (1.1)	7	2.97 (1.1)	7	3.23 (1.23)	5	3.04 (1.23)	
2	Information overload	3.47 (0.95)	3	3.85 (0.86)	2	3.53 (1.17)	2	3.71 (0.78)	1	3.66 (1.05)	
3	Lack of searching skills/access mechanism	3.3 (1.04)	5	3.38 (0.84)	5	3.2 (1.13)	6	3.29 (1.04)	4	3.39 (1.1)	
4	Information scattered in too many sources	3.8 (0.93)	1	3.9 (0.84)	1	3.83 (1.05)	1	3.68 (0.91)	2	3.95 (0.87)	
5	Technical/power/network problems	3.38 (1.05)	4	3.33 (1.02)	6	3.37 (1.13)	4	3.03 (1.14)	6	3.36 (1.15)	
6	Internet connectivity	3.29 (1.12)	6	3.5 (0.91)	4	3.3 (1.21)	5	2.94 (1.15)	7	3.35 (1.15)	
7	Limited knowledge on	3.67	2	3.73	3	3.37	3	3.39	3	3.65	

	technology	(0.87)		(0.82)		(1)		(0.95)		(1.05)	
8	No opportunity to learn	2.69 (1.12)	9	2.75 (1.1)	9	2.57 (1.01)	9	2.74 (1.29)	8	2.7 (1.19)	
9	No guidance / support	2.78 (1.11)	8	2.98 (1.17)	8	2.7 (1.15)	8	2.68 (1.25)	9	2.82 (1.25)	

Rank is derived for each experience group based on the mean and standard deviation of ophthalmologists' barriers. The ranks show up that most of the ophthalmologists in the experience groups "Less than or equal to 5 years", "6 to 10 years", "11 to 15 years", "21 and above years" prefer "Information scattered in too many sources". Most of the ophthalmologists in the experience group "16 to 20 years" face the barrier - "Information overload".

A Kruskal-Wallis H test was conducted to determine if ophthalmologists' barrier differ with experience groups. The mean ranks for the experience groups were Less than or equal to 5 years (311.87), 6 to 10 years (347.91), 11 to 15 years (311.60), 16 to 20 years (297.77), 21 and above years (330.48) respectively. The test showed that there doesn't exist a significant difference between ophthalmologists barrier and experience groups ($\chi 2(2) = 2.500$, P-value=0.645).

The information barriers among ophthalmologists working in different institution types were analyzed further and ranks were assigned based on mean and standard deviation. The mean, standard deviation, rank and Kruskal-Wallis test results were shown in Table 6.

TABLE 6: BARRIERS IN USING INFORMATION Vs INSTITUTION TYPES

S.no	Description	Government		NGO		Corporate	
		Mean (SD)	Rank	Mean (SD)	Rank	Mean (SD)	Rank
1	Lack of time	3.2 (1.21)	8	3 (1.15)	7	2.83 (1.19)	7
2	Information overload	3.98 (0.91)	1	3.53 (0.99)	3	3.4 (0.85)	2
3	Lack of searching skills/access mechanism	3.59 (1.18)	4	3.34 (1.03)	5	2.97 (1.03)	6
4	Information scattered in too many sources	3.8 (0.84)	2	3.85 (0.94)	1	3.73 (0.84)	1
5	Technical/power/network problems	3.56 (1.14)	5	3.37 (1.06)	4	3.16 (1.11)	4
6	Internet connectivity	3.56 (1.05)	5	3.3 (1.13)	6	3.12 (1.11)	5
7	Limited knowledge on technology	3.78 (0.96)	3	3.67 (0.91)	2	3.39 (0.92)	3
8	No opportunity to learn	3.07 (1.17)	9	2.71 (1.13)	9	2.38 (1.03)	9
9	No guidance / support	3.22 (1.15)	7	2.81 (1.15)	8	2.4 (1.08)	8

Rank is derived for each institution type group based on the mean and standard deviation of ophthalmologists' barriers. The ranks show up that most of the ophthalmologists working in Government face the barrier - "Information overload". Most of the ophthalmologists working in the institution types "NGO" and "Corporate" face the barrier - "Information scattered in too many sources".

A Kruskal-Wallis H test was conducted to determine if ophthalmologists' barriers differ with institution types. The mean ranks for the institution types were Government (378.23), NGO (320.12), Corporate (263.51). The test showed that there exist a significant difference between ophthalmologists barriers and institution type ($\chi 2(2) = 11.367$, P-value=0.003).

Determining the major factors of barriers in using information among ophthalmologists

Factor analysis with varimax rotation is used to determine the major factors of barriers in using information among ophthalmologists. The table 7 shows up the factor analysis results of the barriers. The 9 items neatly loaded on 2 factors with a total of 63.159 % variance and total Eigen value of 5.684. The criteria used for identifying the factors were based on the following criteria.

a) Eigen value of factor is greater than one.

b) Two or more items are loading in each factor.

c) Factor loadings are greater than 0.5.

Table 7: Barriers in using information among Ophthalmologists: Factor Analysis Results

S.no	Items	Component	
		Factor 1	Factor 2
1	Lack of time	.841	.144
2	Information overload	.143	.827
3	Lack of searching skills/access mechanism	.530	.514
4	Information scattered in too many sources	.062	.751
5	Technical/power/network problems	.703	.266
6	Internet connectivity	.761	.115
7	Limited knowledge on technology	.363	.670
8	No opportunity to learn	.829	.189
9	No guidance / support	.798	.206
	Eigenvalue	4.404	1.280
	Percentage of variance	48.937	14.222

Note: (N = 633) Factor 1 =Lack of Motivation and Support; Factor 2 = Brunt of Technology

The factors are named as follows:

Factor 1- Lack of Motivation and Support:

Six items loaded on this factor having the highest Eigen value of 4.404 with 48.937% of variance. Loadings range from 0.530 and 0.841. This factor emphasis the barriers due to lack of motivation and support for using information among ophthalmologists. The items are:

1. Lack of time
2. Lack of searching skills/access mechanism
3. Technical/power/network problems
4. Internet connectivity
5. No opportunity to learn
6. No guidance / support

Factor 2- Brunt of Technology:

Three items loaded on this factor having the Eigen value of 1.280 with 14.222% of variance. Loadings range from 0.670 and 0.827. This factor emphasis the barriers due to brunt of technology in using information among ophthalmologists. The items are:

1. Information overload
2. Information scattered in too many sources
3. Limited knowledge on technology

The Wilcoxon signed ranks test was used to test the differences of the scores of the two barrier factors. Table 8 shows up the test results.

Table 8: Ophthalmologists' Recommendation Factors: Wilcoxon Signed Rank Results

		N	Mean Rank	Sum of Ranks
Brunt of Technology - Lack of Motivation and Support	Negative Ranks	89 (a)	143.50	12771.50
	Positive Ranks	421 (b)	279.18	117533.50
	Ties	123 (c)		
	Total	633		
Z	-15.755	Asymp. Sig. (2-tailed)		.000
(a) Brunt of Technology < Lack of Motivation and Support (b) Brunt of Technology > Lack of Motivation and Support (c) Brunt of Technology = Lack of Motivation and Support				

Table 8 shows up that the barriers due to brunt of technology was significantly higher than the lack of motivation and support factor (Z=-5.190; P value = 0.000).

7. Conclusion:

Around 633 ophthalmologists working in 47 academic eye hospitals from 16 states of India were included in the study. The aim of the study is to investigate the barriers in using information among ophthalmologists. The study results revealed that majority of the ophthalmologists encountered the barrier "Information scattered in too many sources" which is followed by "Limited knowledge on technology", "Information overload". The statistical test results showed up that there exist a significant difference between barriers in using information among ophthalmologists and institution type. The two major factors of barriers in using information among ophthalmologists were for lack of motivation and support and brunt of technology. The barriers due to brunt of technology were significantly higher than the lack of motivation and support.

The barriers faced by ophthalmologists can be jointly handled by the ophthalmic libraries, ophthalmic institutions, information service providers and ophthalmic community. The ophthalmic librarians should build appropriate resource collection and serve the ophthalmologists. They should provide information literacy training programs and user orientation programs to enhance the ophthalmologists' information use. The ophthalmic institutions should provide the required infrastructure to the ophthalmologists. The information service providers like online database should provide efficient information retrieval facilities in their services. The facilities should build on the basis of user-centered focus. The ophthalmic community should provide motivation and support to the ophthalmologists. The researchers in the ophthalmic community and other field should focus more research work on removing barriers faced by the ophthalmologists.

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